IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

HALLIBURTON ENERGY SERVICES INC., Plaintiff	§	**Civil Action: 06:05cv155**
	§	**(Jury Demand)**
v.	§	**Judge Leonard Davis**
M-I LLC, Defendant	§	

HALLIBURTON'S OPENING BRIEF ON CLAIM CONSTRUCTION

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 3 of 47

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

Statutes

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 5 of 47

Plaintiff Halliburton Energy Services, Inc. files this "Halliburton's Opening Brief on Claim Construction" pursuant to the Docket Control Order entered by the Court on July 25, 2005.

I. INTRODUCTION

This lawsuit is based upon the infringement by M-I LLC ("M-I") of U.S. Patent Number 6,887,832 (the "'832 Patent"), which discloses certain methods and technology for drilling fluids. The '832 patent technology was patented by Mr. Jeff Kirsner, Mr. Don Siems, Ms. Kimberly Burrows-Lawson and Mr. David Carbajal—all of Halliburton Energy Services, Inc. ("Halliburton"). Among other things, the '832 patent discloses novel methods and formulations for a "fragile gel drilling fluid" for use in drilling in subterranean formations. The "fragile gel drilling fluid" acts like a liquid under stress, such as when drilling, and acts as a gel when the stress is removed, such as when drilling is stopped. This transition occurs quickly and easily. Use of the technology disclosed in the '832 patent eliminates or reduces problems common to prior art drilling fluids such as sag and pressure spikes, greatly reducing drilling costs.

The fragile gel drilling fluids of the '832 patent are marketed under the trade-name "Accolade." Accolade has been a huge commercial success and the product is highly regarded in the marketplace. In 2002 Accolade earned the prestigious Hart's Meritorious Engineering Innovation Award evidencing the pioneering nature of the technology.

Halliburton proposes claim constructions that are based upon the intrinsic evidence—the claim language itself, the '832 patent specification, and its prosecution history—and that are also consistent with the relevant dictionary definitions. Additionally, Halliburton submits the reports of Dr. Ronald Clark an expert in the field of drilling fluids and drilling operations and Professor Roger Bonnecaze an expert in the field of fluid rheology, to assist the Court in understanding the patented technology and as a resource in understanding the meaning of the claim terms to those

skilled in the art. Additionally, the declaration of Mr. Jeff Kirsner is submitted to clarify which of a number of thinners listed in the patent are covered by certain thinner formulas also listed.

II. OVERVIEW OF THE PATENTED TECHNOLOGY

A. Drilling Fluid Characteristics and Components

A drilling fluid is circulated through a wellbore for a variety reasons which include: (1) lubricating and cooling the drill bit; (2) removing drill cuttings from the wellbore; (3) aiding support of the drill pipe; and (4) providing a hydrostatic head to maintain the integrity of the well. *See* the '832 patent attached as Exhibit A at Col. 1:24-31. Additionally, the drilling fluid is used for: (1) carrying materials to the surface where their properties can be analyzed; (2) holding the cuttings in suspension when circulation is stopped; and (3) pushing cement through the casing. In order to perform all of these functions, the drilling fluid (or "mud") must have characteristics that are seemingly mutually exclusive. *See* Report of Dr. Ron Clark, attached as Exhibit B, at 17. Indeed accomplishing each end is difficult and one performance characteristic is often diminished in order to accomplish another. *Id.* The selection of a drilling fluid formulation represents a compromise to balance all of the competing needs for a particular well. *Id*. Selecting which type of drilling fluid to use is driven by many considerations—not the least of which is cost. *Id.* Additionally the location of the well or formation to be drilled may dictate the type of drilling fluid selected. *Id.* at 18-21.

Controlling the proper rheological properties of the drilling fluid, especially viscosity, is key to its performance. *Id.* at 22-25. The viscosity of a drilling fluid represents the fluid's internal resistance to flow—the higher the viscosity of a fluid, the greater its resistance to flow. *Id*. at 22. Some drilling fluids can become more viscous over time and can even form a gel—a fluid having characteristics of a solid. *Id.* at 23. It has long been recognized that an advantageous characteristic of drilling fluid would be that it moves quickly between the gel

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 6 of 46

phase and the liquid phase. *Id*. Drilling fluids displaying such properties were sometimes referred to as "fragile gels" and are beneficial in controlling the forces on the well bore during drilling operations. *Id.* at 24. As of the early 1990s there were examples of water and oil based muds having "fragile gel" characteristics. *Id.* at 18-21. These drilling fluids, however, fell out of favor for various reasons. *Id*. Oil based muds were commonly made up of diesel or mineral oil—oils that could not be used in certain environments like off-shore drilling. *Id*. Water based muds were not suitable for drilling in certain formations such as shale, which are often encountered in offshore drilling. *Id.*

Beginning in the 1990s, newer invert emulsion based drilling fluids were developed in an effort to address these concerns. *Id*. at 20-21. An invert emulsion is a mixture of two or more fluids where one of the fluids is an oil (or oil blend) that forms the continuous or external phase (the carrying phase into which the other components of the fluid are mixed) of the emulsion, and where water commonly comprises the dispersed or internal phase of the emulsion. *Id.* at 19. Common components of such prior art invert emulsion drilling fluids included an invert emulsion base, an emulsifier, organophilic clay for viscosity, a wetting agent to control density, and organophilic lignite for filtration control. *Id*. at 21. At the well site, the operator and mud technician have a myriad of additives available for use in adjusting the composition and properties of the fluid such as thinners, weighting material, emulsifiers, viscosifiers, rheology modifiers, filtration control agents, etc. *Id*. at 35-36. In this sense, providing and maintaining an effective drilling fluid system for each well is an exercise in experimentation requiring constant monitoring and in some cases constant adjustment of the drilling fluid. *Id.*

The performance of the prior art invert emulsion based drilling fluids was less than ideal. *Id*. at 20. For instance, organophilic clay was typically used to provide viscosity to help hold the

cuttings in suspension. *Id.* at 36. But viscosity obtained in this fashion meant significant pressure could be required to obtain re-circulation of the drilling fluid after drilling had stopped. *Id.* at 13. This could lead to undesired surges in pressure that could harm the well by fracturing the formation and causing the loss of drilling fluid and ultimately, loss of the hole if circulation could not be maintained. *Id.* at 13, 16. Additionally, the constant search for the desired viscosity could lead to a viscosity insufficient to properly suspend the weighting material, which leads to sag.[1] *Id.* at 18. Thus, there was an increasing desire and necessity for drilling fluids that could provide superior performance while also meeting increasing environmental restrictions. Col. 1:61 - Col. 2:2. The development of the drilling fluid technology disclosed and claimed in the '832 patent satisfied this growing need.

B. The Inventions of the '832 Patent

The '832 patent is entitled "Method of Formulating and Using a Drilling Mud With Fragile Gels." Claim 1 of the '832 patent is set forth below

> A method for conducting a drilling operation in a subterranean formation using a ***fragile gel drilling fluid*** comprising:
> (a) an invert emulsion base;
> (b) one or more thinners;
> (c) one or more emulsifiers; and
> (d) one or more weighting agents, wherein said operation includes casing in a borehole.

'832 Patent at Col. 14:17-24 (emphasis added). Claim 1 is directed to using invert emulsion based drilling fluid in drilling operations.[2] Claim 5 is an example of the composition of the claimed invert emulsion drilling fluid. Col. 15:28-33. Both contain the limitation "fragile gel drilling fluid." A "fragile gel drilling fluid" is defined in the specification, in part, as "easily

---

[1] "Sag" refers to a condition in high-angle and deviated wells where the weighting materials added to the drilling fluid will settle on the low side of the wellbore.

[2] *See also* asserted claims 2 and 3.

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 9 of 47

disrupted or thinned, and that liquefies or becomes less gel-like and more liquid-like under stress, such as caused by moving the fluid, but which quickly returns to a gel when the movement or other stress is alleviated or removed, such as when circulation of the fluid is stopped, as for example when drilling is stopped." *Id.* at Col. 2:17-32. The formula for a preferred embodiment of the "fragile gel drilling fluids" is set forth in Table 3 in the specification in comparison to a prior art drilling mud. *Id*. at Col. 11:15-55. This specific formula shows no organophilic clay or lignite—a "radical departure from traditional teachings respecting preparing drilling fluids." *Id.* at Col. 3:55-57.

In addition to the formulas and definitions set forth in the patent, additional indicators of the presence of a "fragile gel drilling fluid" are discussed throughout the specification, often in the context of the benefits of the "fragile gel drilling fluid," such as: reduction in the stresses and forces associated with drilling (Col. 2:43-57); "sag problems do not occur" (Col. 2:43-57); "no initial appreciable pressure spike" as observed with pressure while drilling equipment (Col. 2:43-57); low "ECD's" (the difference in surface and downhole equivalent circulating densities, Col. 2:58-65 and Col. 6:30-67); reduced mud (drilling fluid) loss (Col. 4:63-5:52); and generally flat rheology (Col. 8:26-55).

III. APPLICABLE LAW FOR CLAIM CONSTRUCTION

The construction of patent claims is a matter of law that must be determined by the Court. *Markman v. Westview Instruments, Inc.,* 52 F.3d 976 (Fed. Cir. 1995) (en banc), *aff'd,* 116 S. Ct. 1384, 1393 (1996). The objective of claim interpretation is to discern the meaning of the claim terms to a hypothetical person having "ordinary skill in the art" at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc)*; *see also Smithkline Beecham Corp. v. Apotex Corp.,* 403 F.3d 1331, 1338 (Fed. Cir. 2005). Courts must construe claims so as to sustain their validity, if possible, short of actually redrafting the claims. *Rhine v.*

Case 6:05-cv-00155-LED Document 93 Filed 03/20/2006 Page 10 of 47

Casio, Inc., 183 F.3d 1342, 1345 (Fed. Cir. 1999); *Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 937 n.5 (Fed Cir. 1983).

The order and relevance of material to consider when construing claims is well established. First, courts examine the patent's intrinsic evidence to define the patented invention's scope. *Phillips*, 415 F.3d at 1312. This intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Id.* at 1314 (citations omitted). It is fundamental that the claims of a patent define the invention to which the patentee is entitled the right to exclude. *Id.* at 1312 (citation omitted). But the claims "must be read in view of the specification, of which they are a part." *Id.* (quoting *Markman*, 52 F.3d at 978). "The specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *see also Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002).

However, Courts must take "extreme care" when ascertaining the proper scope of the claims not to "simultaneously import into the claims limitations that were unintended by the patentee." *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1324 (Fed. Cir. 2003). The specification may limit claim language only if the written description "makes clear" that a particular feature is outside the reach of the patent claims. *SciMed Life Sys., Inc. v. Adv. Cardio. Sys., Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001). Only where the patentee has used a claim term throughout the entire patent specification, in a manner consistent with only a single meaning, would the specification impose such a limitation. *Bell Atl. Network Servs., Inc. v. Covad Comm. Group, Inc.*, 262 F.3d 1258, 1271 (Fed. Cir. 2001). Consequently, courts may not incorporate

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 10 of 47

into a claim the unclaimed attributes of the preferred embodiments described in the specification. *Amgen*, 314 F.3d at 1328.

Second, extrinsic evidence can be useful, but it is "less significant than the intrinsic record in determining the legally operative meaning of claim language." *Phillips*, 415 F.3d at 1317 (citations omitted). Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.* "In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence." *Vitronics*, 90 F.3d at 1582. Only "in the rare circumstance that the court is unable to determine the meaning of the asserted claims after assessing the intrinsic evidence, it may look to additional evidence that is extrinsic to the complete document to help resolve any lack of clarity." *Bell Atl.*, 262 F.3d at 1269. Expert testimony is an accepted aid to a court for understanding the underlying technology and determining the particular meaning of a term in the pertinent field, and to confirm that the proposed construction is not inconsistent with the understanding of one skilled in the art. *Pitney Bowes v. Hewlett-Packard Co.*, 182 F.3d 1298, 1309 (Fed. Cir. 1999).

IV. CONSTRUCTION OF THE DISPUTED CLAIM TERMS

In the parties' Joint Claim Construction Statement, Halliburton and M-I jointly identified eight terms for construction, Halliburton identified an additional two terms for construction, and M-I identified an additional twenty-five terms for construction. Subsequently, the parties agreed to constructions on seven of those terms, and three additional terms were eliminated by virtue of Halliburton removing several claims from its list of asserted claims (these terms were identified by M-I alone).

Of the remaining terms identified by Halliburton (alone or jointly with M-I), three include the term "fragile gel" which has already been addressed to a large extent in Halliburton's

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 11 of 47

Opposition Defendant's Motion for Summary Judgment" ("Halliburton's Opposition") filed commensurate herewith and incorporated herein. *See* Exhibit A to the Joint Claim Construction Statement, Dkt. No. 54. Of the remaining terms identified by M-I (alone or jointly with Halliburton) M-I asserts that six of the terms (including "fragile gel behavior") are "incapable of construction." M-I does not propose an alternative construction for the claim terms that M-I asserts are incapable of construction. Thus the only issue for these terms is whether they meet the threshold of being definite under 35 U.S.C. §112 ¶2.

Halliburton will first address those claim terms it asserts require construction, then Halliburton will address those claim terms identified by M-I for which it proposes a construction and finally, Halliburton will address those terms for which M-I asserts construction is impossible.

A. Construction of the Terms Identified by Halliburton[3]

1. "Fragile Gel Drilling Fluid"[4] as Used in Claims 1, 2, 3, 5, 8, 9, 10, 47, 48, 85, 86, and 123

To a large extent Halliburton already addressed the construction for this term in "Halliburton's Opposition to Defendant's Motion for Summary Judgment of Invalidity" (incorporated by reference into this pleading) and will not repeat those arguments here. Halliburton will address the second part of the construction it proposes regarding the lack of organophilic material as highlighted in the entire proposed construction for the term "fragile gel drilling fluid" below:

> A fragile gel drilling fluid is a gel that easily transitions to a liquid state upon the introduction of force (*e.g.*, when drilling starts) and returns to a gel when the force

---

[3] Included in this section are the terms both Halliburton and M-I identified except those for which M-I claims are incapable of construction which are addressed in §IV.C.

[4] In some of the dependent claims, the term "fragile gel drilling fluid" is referred to as "said fragile gel." There is no reason to distinguish between the two forms.

Case 6:05-cv-00155-LED Document 98 Filed 03/17/2006 Page 13 of 47

> is removed (*e.g.*, when drilling stops); the fragile gel, at rest, is capable of suspending drill cuttings and weighting materials. ***A fragile gel drilling fluid contains no organophilic clay or organophilic lignite or can contain low amounts of organophilic clay or lignite individually or in combination so that the fragile gel can still easily transition between a gel and liquid state and suspend drill cuttings and weighting materials.***

See Joint Claim Construction Statement Ex. A at 2 (emphasis added). M-I offers no alternative construction for the term "fragile gel drilling fluid" or any term containing the phrase "fragile gel."

Halliburton's proposed claim construction reflects the definition of the term "fragile gel" as set forth in the patent but also in the context of the terms it modifies. *Phillips*, 415 F.3d at 1314 ("To begin with, the context in which a term is used in the asserted claim can be highly instructive."). The term "fragile gel" is used as an adjective to modify the noun "drilling fluid" (*see* independent Claims 1-3 and 5), hence, the term "fragile gel" must be defined in the context in which it is used—a "fragile gel drilling fluid." Thus, the language in the '832 patent defining a "fragile gel" (e.g. Col. 2:27-33) and discussed in Halliburton's Opposition is but the starting point of this inquiry. The rest of the specification must also be consulted—usually dispositive, it is the single best guide to the meaning of a disputed term. *Phillips,* 415 F.3d at 1315. Indeed, "one purpose for examining the specification is to determine if the patentee has limited the scope of the claims." *SciMed Life,* 242 F.3d at 1341. And that is exactly what happened in the '832 patent.

The specification describes the drilling fluid of the invention in terms of its behavior and the formulation that sets it apart from prior art drilling fluids. Specifically, an invert emulsion drilling fluid is prepared that forms "fragile gels" or has "fragile gel behavior" "preferably" without any organophilic clays or organophilic lignites—organophilic material. Col. 3:19-25. The '832 patent teaches that the invert emulsion of the present invention does not need

organophilic clay or organophilic lignites to provide it with needed viscosity, suspension characteristics, or filtration control to carry drill cuttings to the well surface. Col. 13:66 – Col. 14:4. The specification states:

> Moreover, the lack of organophilic clays and organophilic lignites in the fluid is believed to enhance the tolerance of the fluid to the drill cuttings. That is, the lack of organophilic clays and organophilic lignites in the fluid of the invention is believed to enable the fluid to suspend and carry drill cuttings without significant change in the fluid's rheological properties. Col. 14:4-10.

Table 3 of the patent provides a formulation for an embodiment of the claimed "fragile gel" drilling fluid in comparison to a prior art invert emulsion drilling fluid. The relevant portion of Table 3 is set forth below:

TABLE 3

Fluids and Compounds	ACCOLADE ™ System	Isomerized Olefin Based Invert Emulsion Drilling Fluid
	Example Formulations	
ACCOLADE ™ Base (bbl)	0.590	—
SF ™ Base (bbl)	—	0.568
LE MUL ™[1] (lb)	—	4
LE SUPERMUL ™[2] (lb)	10	6
Lime (lb)	1	4
DURATONE ® HT[3] (lb)	—	4
Freshwater (bbl)	0.263	0.254
ADAPTA ® HP[4] (lb)	2	—
RHEMOD L ™[5] (lb)	1	—
GELTONE ® II[6] (lb)	—	5
VIS-PLUS ®[7] (lb)	—	1.5
BAROID ®[8] (lb)	138	138
Calcium chloride (lb)	32	31
DEEP-TREAT ®[9] (lb)	—	2

As seen in Table 3 there is no organophilic clay (Geltone® II) or organophilic lignite (Duratone® HT). Col. 11:15-56. Indeed the lack of organophilic clay is described as "a radical departure from traditional teachings respecting preparation of drilling fluids." Col. 3:56-57. At the time of filing the '832 patent there were many invert emulsions in use. Clark Rep. at 20-21. The standard thinking, however, was that these invert emulsions required the addition of organophilic clay to provide the needed viscosity. *Id.* at 36.

The lack of organophilic material is not just a preferred embodiment—it is used to distinguish the formula of the claimed drilling fluid over the prior art drilling fluids and should properly be reflected in the construction of the term "fragile gel drilling fluid." When the claimed invention is distinguished from the prior art in the specification, the claims should not be read broadly to encompass the distinguished prior art. *Scimed Life*, 242 F.3d at 1343 (citing *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998) (specification distinguished prior art as inferior and touted advantages of conical shaped cup for use in artificial hip device, and "such statements make clear that the '589 patent discloses only conical shaped cups and nothing further.")). Without the organophilic material limitation set forth in Halliburton's proposed construction, the claims could arguably read on the formula of the distinguished prior art "isomerized olefin based system" (Petrofree SF). This is a result that the *Scimed Life* case precludes. Therefore, the definition of a "fragile gel drilling fluid" must properly reflect the sum of its two parts—a "fragile gel" as explained in Halliburton's Opposition and a "drilling fluid" as distinguished from the prior art. The construction proposed by Halliburton accomplishes this end.

The support for the low amount of organophilic material reflected in Halliburton's proposed construction is found in the specification. First, the term "clayless" is defined in the specification as "lacking" organophilic clay. Col. 3:53-56. The term "clayless," however, is not found in the claims. Hence there was no intention to so limit the claims to completely "clayless" formulations. Second, the word "lacking" does not equate to none or absolutely zero clay. (Lacking means to be "deficient or missing." *Merriman-Webster's Collegiate Dictionary.* 10th Ed. (1993)). Indeed the specification speaks in terms of "preferably" no organophilic material is added. Abstract; Col. 3:20-24; Col. 3:52-54. And the invention is described as able to achieve

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 16 of 47

its advantages without the "need" for organophilic material—not that it must be eliminated altogether to obtain the "fragile gel" advantages. Col. 2:48-51; Col. 14:1-10. Thus, some low amount of organophilic material is acceptable as long as this low amount of organophilic material does not defeat the "fragile gel" properties of the fluid. Otherwise infringement could be avoided by adding an insignificant amount of organophilic material while still enjoying the benefits of a fragile gel. This would be an absurd result based on a contortion of the clear intent to avoid such a situation as evidenced by the claims in the '832 patent.

Dependent claims 20, 58, 95, and 125 add the further limitation "said drilling fluid is substantially free of organophilic clays." Col. 16:57-58. The term "substantially" is commonly used in drafting claims and carries with it a readily understood meaning. The term is employed in order to "avoid a strict numerical boundary to the specified" parameter. *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002). "The term 'substantial' is a meaningful modifier implying 'approximate', rather than 'perfect.'" *Liquid Dynamics Corp. v. Vaughan Co., Inc.*, 355 F.3d 1361, 1368 (Fed. Cir. 2004); *see also Cordis Corp. v. Medtronic Ave, Inc.*, 339 F.3d 1352, 1361 (Fed. Cir. 2003) (the term "substantially uniform thickness" was not limited to a numeric value noting that the proper interpretation of this term was "of largely or approximately uniform thickness" unless something in the prosecution history imposed the "clear and unmistakable disclaimer" needed for narrowing beyond this plain-language interpretation). The specific limit to be avoided here is "absolutely no" or "zero" organophilic clay. The doctrine of claim differentiation does not mandate a different result. Claim differentiation only creates a presumption that each claim in a patent has a different scope; it is "not a hard and fast rule of construction." *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998). "Claim differentiation can not broaden claims beyond their

Case 6:05-cv-00155-LED Document 93 Filed 03/10/2006 Page 16 of 46

correct scope." *Multiform Desiccants Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1480 (Fed. Cir. 1998). Claims that are written in different words may ultimately cover substantially the same subject matter. *Id.* (citations omitted). Thus, claims 20, 58, 95, and 125 may share a scope comparable to the claims from which they depend while also evidencing the intent of the inventors not to be limited to no organophilic clay whatsoever.

Further, since both the lignite and clay at issue are organophilic, they share a common property—a quaternary amine carbon chain that causes both to be suspended in the claimed emulsion in the same fashion. Clark Rep. at 81; *see also* Expert Report of Dr. Roger Bonnecaze, attached as Exhibit C, at 21. One of ordinary skill in the art, therefore, would appreciate that the claimed invention could tolerate some low amount of organophilic material like organophilic clay and/or lignite and still be a fragile gel drilling fluid. Clark Rep. at 81-83; Bonnecaze Rep. at 21. Therefore, the term "fragile gel drilling fluid" should be construed so that it may contain low amounts of organophilic material so long as it does not prevent the drilling fluid from acting as a fragile gel. This construction properly reflects the intent of the inventors to avoid the prospect that infringement could be avoided by adding a trivial, non-consequential amount of organophilic material. Indeed, the fact that the various layered subterranean formations encountered during drilling can add clay and other impurities to the drilling fluid is a reality that is well understood by those of ordinary skill in the art. Clark Rep. at 11 (n.4). The ability of the claimed fluid to tolerate some impurities and still function as a "fragile gel drilling fluid" is reflected in the second sentence of Halliburton's proposed construction—"A fragile gel drilling fluid contains no organophilic clay or organophilic lignite or can contain low amounts of organophilic clay or lignite individually or in combination so that the fragile gel can still easily transition between a gel and liquid state and suspend drill cuttings and weighting materials."

The prosecution history also supports Halliburton's proposed construction. In an office action, the examiner rejected the claims on the grounds that the claimed invention was anticipated by a number of prior art invert emulsions. 06/04/04 Office Action at ¶¶4-8. In response, the applicants distinguished the claimed invention prior art by noting that none of the cited prior art invert emulsion drilling fluids exhibited fragile gel characteristics. 09/04/04 Response at 31-33. In support of the arguments contained in the response the examiner was directed to, among other things, Table 3 in the patent, which provides a formulation for an embodiment of the claimed "fragile gel" drilling fluid having no organophilic clay.

Therefore, as demonstrated by the totality of the intrinsic evidence in light of the knowledge of a person skilled in the art and as confirmed by the extrinsic evidence, the term "fragile gel drilling fluid" should be construed as proposed by Halliburton.

2. "Thinner" as Used In Claims 1-3, 5, 12, 50 and 88

Halliburton proposes that the term "thinner" be given its ordinary meaning—"an additive that reduces viscosity." *See* Joint Claim Construction Statement, Dkt No. 54 Ex. A. at 2. M-I seeks to improperly limit this term to specific formulas for two of the preferred embodiments set forth in the specification. Review of the intrinsic record reveals that there is no justification for adopting the narrow construction proposed by M-I.

"Thinner" as used in the claims is a component of the "fragile gel drilling fluid." *See e.g.* Claim 1, Col 14:17-20. Unasserted claims 4, 7, 41, 44, 79, 82, 116, 119, 120, and 148 set forth formulas for specific embodiments of the "thinner." M-I seeks to limit the claims to these exemplar formulas.

The specification does not specifically define or otherwise limit the term "thinner." Instead the specification provides several examples of the types of thinners that can be used in the inventions of the '832 patent. For example the specification states as follows:

> ***Preferred commercially available thinners include, for example***, products having the tradenames COLDTROL® (alcohol derivative), OMC2™ (oligomeric fatty acid), ATC® (modified fatty acid ester), to be used alone or in combination, and available from Halliburton Energy Services, Inc. in Houston, Tex. Col. 10:52-57 (emphasis added).
>
> Further, the invert emulsion drilling fluid of the invention or for use in the present invention has added to it or mixed with the invert emulsion base, other fluids or materials needed to comprise a complete drilling fluid. ***Such materials may include for example additives to reduce or control temperature rheology or to provide thinning, such as, for example, additives having the tradenames COLDTROL®, RHEMOD L®, ATC®, and OMC2®,*** additives for providing temporary increased viscosity for shipping (transport to the well site) and for use in sweeps, such as, for example an additive having the tradename TEMPERUS[R] (modified fatty acid); … Col. 13:41-53. (emphasis added)

The specification also describes the use of certain formulations of thinners for "selective thinning" in certain temperature variant environments:

> Thinners disclosed in International Patent Application Nos. PCT/US00/35609 and PCT/US00/35610 … are particularly useful in the present invention for effecting such **"*selective thinning*"** of the fluid of the present invention; that is thinning at lower temperatures without rendering the fluid too thin at higher temperatures. Col. 9:22-33 (emphasis added).

The specification goes on to describe formulas for such "selective" thinners and instructs that such formulas should be used to achieve the "selective" thinning results described. Col. 9:22-Col. 10:24. The "selective thinning" across various temperatures described in the specification is set forth, for example, in Claim 12 which depends from claim 1. The specification also provides "alternative" formulas for thinners that may be used to achieve the claimed inventions. Col. 10:26-58. There is, however, no suggestion in the specification that only the "thinners" fitting the formulas in the specification can be used.

Moreover, only two of the thinners whose trade names are listed in the patent as preferred thinners, meet formulas set forth in the patent, namely COLDTROL and ATC. *See* Declaration of Mr. Jeff Kirsner, attached as Exhibit D. The other thinners, OMC2 (Col. 10:54) and DEEP

TREAT (Col. 11:9-10) do not. *Id.* Thus, the construction proposed by M-I would not cover the various thinners identified as preferred embodiments. Claim constructions that would exclude embodiments described in the specification are rarely, if ever, correct, absent prosecution disclaimer or other substantive reason. *See, e.g., Vitronics,* 90 F.3d at 1583. Neither prosecution disclaimer nor other substantive reasons are present here. The specification identifies many possible "thinners," using the term in a manner consistent with its ordinary meaning—"an additive that reduces viscosity"—as proposed by Halliburton.

Further, the extrinsic evidence confirms this construction. *The Glossary of Oilfield Production Terminology,* 1st Ed. (1988) defines a "thinner" as:

> Any of various organic agents (tannings, lignites, lignosulfanates, etc.) and inorganic agents (pyrophosphates, tetraphosphates, etc.) that are added to a drilling fluid to reduce the viscosity and/or thixotropic properties.

And Dr. Clark opines that a person of ordinary skill in the art would construe the term as has been proposed by Halliburton. Clark Rep. at 43-45.

M-I ignores the plain teachings of the patent and attempts to limit the term "thinner" to "thinners" having the formulas set forth in the specification. Col. 9:22-Col. 10:53. Joint Claim Construction Statement Ex. A at 2. But as set forth above, these formulas do not cover all of the preferred thinners identified in the patent for use in the claimed invention. Absent extraordinary circumstances, limiting the claims to the preferred embodiments, much less some of them, found in the specification is improper. *See, e.g., SciMed*, 242 F.3d at 1341 (the written description must make it clear that a particular feature is outside the reach of the patent claims). Identified in the '832 patent as appropriate for use in the inventions claimed are thinners that do not meet the formulas set forth in the specification, namely, OMC2 and Deep Treat. Thus, the term thinner must be construed to encompass these types of thinners as well as those meeting the specific

Case 6:05-cv-00155-LED Document 139 Filed 03/17/2006 Page 21 of 47

formulas in the specification. M-I's proposed construction of the term "thinner" fails to make this accommodation and should be rejected.

3. "Immediately Upon Resumption of Drilling" as Used in Claims 10, 48, 86, and 123

Halliburton proposes the term "immediately upon resumption of drilling" should be given its ordinary meaning as understood in the context in which it is used—to describe physical phenomenon associated with the real world application of the claimed "fragile gel drilling fluid." As such, the behavior of the drilling fluid "immediately upon resumption of drilling" is subject to the laws of physics meaning that some amount of time is necessary for the forces associated with the resumption of drilling to reach the bottom of the borehole. Halliburton proposes the following construction for the term "immediately upon resumption of drilling:"

> Immediately upon resumption of drilling means without substantial interval of time when drilling begins again after interruption.

The term "substantial" is employed in order to "avoid a strict numerical boundary to the specified" parameter. *Verve,* 311 F.3d at 1120. Here the phrase "without substantial interval time" includes within its ambit the time needed for the forces associated with "resumption of drilling" to affect the drilling fluid throughout the wellbore.

Drilling involves a constant process of starting and stopping because of the need to add drill pipe, clean the hole or a host of other reasons. While this is happening, the circulation of the drilling fluid will cease and the fluid will be in a "period of rest" as reflected in claims 10, 48, 86, and 123. To resume drilling, the mud pumps will be restarted and the engines for turning the drill string re-engaged. The patent teaches that the forces associated with these actions cause the gel to transition to a fluid. Col. 2:276-33. These actions, like all others, are subject to the laws of physics. This must be reflected in the proper claim construction. *See*, *e.g., Nikken United States v. Robinsons-May, Inc.*, 2002 U.S. App. LEXIS 23884, **17 (Fed. Cir. 2002) (unreported)

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 21 of 47

(proper interpretation is "one that comports with the claim language, the specification, and the laws of physics").

The rotary motion applied at the top of the drill string will not translate immediately to rotation of the bottom of the drill string. Clark Rep. at 46. A segment of drill pipe, while made of steel, will nonetheless bend and flex slightly over the course of thousands of feet of drill string. *Id*. This will result in the pipe at the top of the drill string rotating several times before the pipe at the bottom of the drill string has even begun to move. *Id.* Further, although the gels in the fluid immediately adjacent to the drill string may transition to a liquid, the gels further away from the drill string (and closer to the wall of the annulus) may not experience that force, that is, there may be an additional delay between the time that the gels next to the drill pipe break and the gels further from the drill pipe break. *Id*. Similarly, restarting the drilling fluid pump causes the introduction of drilling fluid into the drill pipe at the top of the well, displacing the fluid already in the well. *Id*. at 46-47. However, the movement of the fluid must be transmitted all of the way down the inside drill pipe, through the drill bit, and then back up the annulus. *Id*. For a well that is thousands of feet deep, the drilling fluid at the very top of the annulus may not be displaced for several seconds. *Id*. Restarting the drilling fluid pump will generally cause a "pressure wave" to travel down the wellbore independent of the actual motion of the fluid. *Id*. at 47. How the pumps are engaged will determine the size of the force that is associated with the pressure wave and whether the pressure wave is sufficient to reach throughout the wellbore. *Id*. This pressure wave will travel at the speed of sound, and its ability to reach throughout the wellbore is further dependent on the temperature and the density of the drilling fluid *Id*. Again, in a well that is thousands of feet deep, the pressure wave may take several seconds to reach the bottom of the well, even at the speed of sound. *Id*. Against these basic laws of physics, and

Case 6:05-cv-00155-LED Document 93 Filed 03/20/2006 Page 23 of 47

based on the plain language of the claim, a person of ordinary skill would interpret this claim as to include some amount of time to disrupt the drilling fluid upon resumption of drilling. *Id*. at 47-48. That some time is required for the forces associated with "resumption of drilling" to affect the drilling fluid throughout the wellbore is properly reflected in Halliburton's proposed construction.

M-I proposes that this term be construed as "without interval of time when drilling begins again." This definition defies the laws of physics as well as common sense. It cannot be disputed that the laws of physics dictate that the forces associated with the resumption of drilling will take some amount of time to transmit through the entire length of the wellbore, depending on the depth of the well and other factors. M-I's proposed construction should be rejected.

4. "Maintains its Viscosity at Higher Temperatures" as Used in Claims 51 and 89

Halliburton proposes that the term "maintains its viscosity at higher temperatures" should be given its broad ordinary meaning subject to the specific definition for "higher temperatures" which the parties agree should be defined as "over about 120 degrees" as set forth in the specification. Col. 3:12-18. Therefore, Halliburton proposes the following construction:

> Maintains its viscosity at higher temperatures means viscosity does not substantially change at temperatures over about 120 degrees Fahrenheit.

The dispute arises regarding M-I's improper attempt to limit the term "maintains" to mean "the same." This definition is expressly contradicted by the specification, which teaches:

> Prior art oil-based fluids typically have lower yield points at higher temperatures, as traditional or prior art oils tend to thin or have reduced viscosity as temperatures increase. In contrast, the fluid of the invention can be thinned at lower temperatures ***without significantly affecting the viscosity of the fluid at higher temperatures.*** This feature or characteristic of the invention is a further indicator that the invention will provide good performance as a drilling fluid and will provide low ECDs. Moreover, this characteristic indicates the ability of the fluid to ***maintain viscosity at higher temperatures***. Col. 8:67 – Col. 9:10 (emphasis added).

> Thinners disclosed in International Patent Application Nos. PCT/US00/35609 and PCT/US00/35610 … are particularly useful in the present invention for effecting such "selective thinning" of the fluid of the present invention; that is thinning at lower temperatures ***without rendering the fluid too thin at higher temperatures***.
> Col. 9:22-33 (emphasis added).

Moreover, the data shown in Table 2 demonstrates that the viscosity of the claimed drilling fluids varies as a function of shear rate, pressure, and temperature, including at "higher temperatures." *See* Table 2 at Col 7:30-50. When a drilling fluid of the claimed invention was tested with a Fann-75, the dial readings, the plastic viscosity, and the yield points all show some deviation as the shear rate, temperature, and pressure change. *Id.* Under no conditions did the viscosity remain "the same" as proposed by M-I. Further, Halliburton's proposed construction is not inconsistent with the dictionary definition for "maintain" which is "to keep in an existing state," given that the "existing state" described in the specification is a state that does not substantially vary. *See Merriam-Webster's Collegiate Dictionary*, 10th Ed. (2001); s*ee also* Clark Rep. at 50-52. Therefore, Halliburton's proposed construction should be adopted.

M-I's proposed construction runs contrary to the specification, which discloses that the claimed invention can be thinned without "significantly" affecting the viscosity at higher temperatures—not that it remains the same at "higher temperatures." In sum M-I seeks to impose a limitation that is not only absent from the specification but not supported by the specification in any way. Further, in light of the data in Table 2, M-I's proposed construction would exclude the preferred embodiment, which is an improper result. *See, e.g., Vitronics*, 90 F.3d at 1583. M-I's proposed construction should be rejected**.**

5. "Immediately Disrupted" (By Movement of Said Fluid) as Used in Claims 9, 47, and 85

Halliburton proposes that the term "immediately disrupted by movement of said fluid" should receive its ordinary meaning as follows: "broken apart without substantial interval of

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 25 of 47

time." This definition is consistent with the meaning of the term "immediately upon resumption of drilling" set forth in §IV.A.3., *supra*. For the same reasons, which will not be repeated here, "immediately disrupted" must also be construed consistently with the laws of physics. This is consistent with the dictionary definition of the term "immediately"— without interval of time—read in the context of the physical world in which the claimed invention is used. *Merriam-Webster's Collegiate Dictionary*, 10th Ed. (2001). M-I proposes the construction "without any interval of time"—an impossibility that should be rejected by the court.

6. "Instantaneously Disruptible" (By Movement) as Used in Claims 42, 80, 117, and 121

Halliburton proposes that the term "instantaneously disruptible" should receive its ordinary meaning as follows: "able to be broken apart without any perceptible duration of time." Like the terms "immediately disrupted by movement of said fluid" and "immediately upon resumption of drilling" the time constraint of "instantaneously" is subject to the laws of physics. Upon reading the claims containing the term "instantaneously disruptible" in the context of the rest of the claims it becomes clear that the intent was to set forth a time constraint for "instantaneously" that is more restrictive than "immediately." However, Halliburton's proposed construction also attempts to achieve the balance between that intent and the laws of physics by defining instantaneously as without a "perceptible duration of time" meaning that the transition actually takes some time but it is so low as to be imperceptible. This definition is consistent with the dictionary definition of "instantaneously"—done, occurring, or acting without any perceptible duration of time—read in the proper context physical world in which the claimed invention is used.

M-I, on the other hand, proposes substantively the same definition for "instantaneously" as it does for "immediately," namely "without any time interval." M-I's construction fails to take

Case 6:05-cv-00155-LED Document 93 Filed 03/20/2006 Page 26 of 47

into account the laws of physics and also the intent of the applicants to differentiate between the terms "instantaneously" and "immediately," as indicated by the use of these different words to describe the transition of the claimed drilling fluid from a gel to a liquid. M-I's proposed construction should be rejected.

B. Construction of the Terms Identified by M-I[5]

1. "Conducting a Drilling Operation" as Used in Claims 1, 2, 45 and 46

As used in the claims, "conducting a drilling operation" is found only in the preambles of independent claims 1, 2 and dependent claims 45 and 46 which depend from claim 2. The term "drilling operation" found in the preamble serves as the antecedent basis for various specific drilling operations found in the body of claims 1, 45 and 46 as follows:

> A method for conducting a drilling operation in a subterranean formation … wherein ***said operation includes running casing in a borehole***.
>
> The method of claim 2 ***said operation includes drilling a borehole***.
>
> The method of claim 2 wherein ***said operation includes cementing a borehole***.

Col. 14:17-25 (claim 1) and Col. 19:24-28 (claims 45 and 46) (emphasis added). Halliburton proposes the term "conducting a drilling operation" should be given it broad ordinary meaning as follows:

> Conducting a drilling operation means directing or taking part in the operation or management of drilling, running casing and/or cementing.

The specification defines a "drilling operation" as follows:

> As used herein, the term "drilling operations" shall mean ***drilling, running casing and/or cementing*** unless indicated otherwise.

[5] M-I also identified the term "lower yield point" as used in claims 13, 52, 90 and 129 and the term "flowable or liquid state" as used in claims 10, 48, 86, 123. M-I now asserts that these terms do not require construction beyond their plain meaning. Halliburton understands this to mean M-I is dropping these terms but request the court to adopt its constructions set forth in the Joint Claim Construction Statement in order to avoid the prospect of these terms becoming an issue at a later date.

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 27 of 47

Col. 5:48-52 (emphasis added). This is properly reflected in Halliburton's proposed construction. M-I does not include this definition in its proposed construction and also seeks to improperly limit the term "conducting." The specification, however, does not define the term "conducting." Halliburton proposes it should be given its common ordinary meaning. *Merriman-Webster's Collegiate Dictionary,* 10th Ed. (2001), defines "conduct" as:

> To direct or take part in the operation or management of.<*conduct* an experiment> <*conduct* a business> <*conduct* an investigation>

M-I's construction unduly limits "conducting" to "***directing*** the act," keying on the management of the drilling operation and effectively ignoring the drilling-related tasks that must be accomplished by non-management rig personnel (for example, the roughnecks, the roustabouts, the mud engineers, geologists, and so on) to complete the drilling operation in question. M-I's proposed construction is a not-so-subtle attempt to craft an argument of non-infringement. M-I supplies mud technicians to aid the well operator in maintaining the properties of the drilling fluid. M-I would argue that its mud engineer does not "direct" the drilling operation. Under the broad ordinary meaning proposed by Halliburton, M-I is an active participant in the "conducting" of a drilling operation. There is no reason to so limit the ordinary meaning of the term "conducting" absent M-I's contrived noninfringement argument. M-I's proposed construction should be rejected.

2. "Invert Emulsion Base" as Used in Claims 1, 2, 3 and 5.

Halliburton proposes that the term "invert emulsion base" be given its ordinary meaning. M-I seeks to improperly limit this term to "a blend of esters and olefins," one of the preferred embodiments of the specification. M-I's proposal ignores several claims that expressly teach the use of non-ester-olefin blends as invert emulsion bases, and ignores the specification that

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 27 of 46

expressly teaches that the invert emulsion base is not limited to any particular formula. Halliburton proposes the following construction:

> An invert emulsion base is two or more fluids wherein one of said fluids is an oil and constitutes the continuous phase.

The term "invert emulsion base" is a component of the claimed drilling fluid. *E.g.,* Claim 1, Col. 14:17-25. Other claims expressly list numerous possible formulations for the invert emulsion base. *E.g.,* Claim 6, Col. 15:35-53. The specification makes clear that the "invert emulsion base" should not be limited to any particular formula:

> The invert emulsion drilling fluids of the present invention have an invert emulsion base. ***This base is not limited to a single formulation***. Col. 11:66 – Col. 12:1 (emphasis added).

The specification also provides examples of base fluids that are not "a blend of esters and olefins":

> ***Other examples of possible suitable invert emulsion bases*** for the drilling fluids of the present invention include isomerized olefins blended with other hydrocarbons such as linear alpha olefins, paraffins, or naphthenes, or combinations thereof ("hydrocarbon blends"). Col. 12:66 – Col. 13:3 (emphasis added).
>
> Invert emulsion drilling fluids may be prepared comprising SF Base ***without the ester****…* " Col. 12:51-52 (emphasis added).

Thus, this term should be given its broad ordinary meaning as proposed by Halliburton.

The extrinsic evidence also supports this conclusion. The *Glossary of Oilfield Production Terminology* (1988) defines an "invert emulsion" as:

> A water-in-oil emulsion where fresh or salt water is the dispersed phase and diesel, crude, or some other oil is the continuous phase. Water increases the viscosity and oil reduces the viscosity.

M-I improperly seeks to limit this term to a preferred embodiment. Importing limitations into the claims without reason to do so and in contravention of the express teachings of the patent is improper. *See SciMed* Life, 242 F.3d at 1340-41. Nowhere in the specification is there

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 29 of 47

any indication that the claimed invert emulsion base fluid should be limited to "a blend of esters and olefins" as proposed by M-I. To the contrary, the specification teaches the based fluids are not so limited and provides numerous examples of blends that are not "esters and olefins" blends. M-I's proposed construction would improperly exclude other preferred embodiments from the specification. *See Vitronics*, 90 F.3d at 1583. Finally, M-I's unjustified limitation to ester-olefin blends would render several other claims meaningless. For example, if the invert emulsion base could only be an ester-olefin blend, then claim 6 would have no meaning. Therefore, M-I's proposed construction should be rejected.

3. "ECDs" as Used in Claims 3, 16, 54, 124 and "Equivalent Circulating Densities" as Used in Claims 15, 53 and 92

At first glance it appears that the term "ECD" is merely an acronym for "equivalent circulating density," however, the specification of the '832 patent eliminates any potential for confusion by explaining what is meant by each term. Halliburton proposes that the terms "ECD" and "equivalent circulating density" reflect this explanation. M-I ignores these definitions and seeks to improperly inject a formula not found in the patent to define these terms. Joint Claim Construction Statement, Dkt. No. Ex. A at 4, 6. M-I recently proposed a change in its position adopting Halliburton's construction with the injection of the phrase "at the wellhead" and changing "equivalent circulating density" to "equivalent circulating densities." See Letter, Ex. E. But like its original definition, M-I seeks to inject confusion where none exists.

The difference in the respective terms is explained in the specification as follows:

> This difference in a drilling fluid's measured surface density at the well head and the drilling fluid's equivalent circulating density downhole (as typically measured during drilling by downhole pressure-while-drilling (PWD) equipment) is often called "ECD" in the industry. Low "ECDs", that is, a minimal difference in surface and downhole equivalent circulating densities, is critical in drilling deep water wells and other wells where the differences in subterranean formation pore pressures and fracture gradients are small. Col. 6:36-46 (emphasis added).

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 30 of 47

Thus, the "equivalent circulating density" is the down hole measurement and "ECDs" refers to the difference in the "equivalent circulating density" and "surface density." Further, the "equivalent circulating densities" are obtained with downhole pressure-while-drilling equipment. Table 1 and Fig. 5(a), as well as the consistent meaning and usage throughout the specification, further illustrate the difference between "equivalent circulating densities," "ECDs," and "surface densities." According to the accompanying text:

> Table 1 below and Fig. 5(a) showing the Table 1 data in graph form illustrate the consistently stable and relatively ***minimal difference in equivalent circulating density and actual mud weight or well surface density*** for the fluids of the invention. This ***minimal difference*** is further illustrated in FIG. 5(a) and in Table I by showing the ***equivalent circulating density downhole*** for a commercially available isomerized olefin drilling fluid in comparison to the drilling fluid of the present invention. Both fluids had the same well surface density. ***The difference*** in equivalent circulating density and well surface density for the prior art fluid however was consistently greater than such difference for the fluid of the invention. Col. 6:48-61 (emphasis added).

Therefore, Halliburton proposes the following definitions for "equivalent circulating density" and "ECDs:"

> Equivalent circulating density means the pressure, as calculated in terms of density, exerted by the drilling fluid on the formation at any given point in the well while the fluid is circulating.

> ECD means the difference in the drilling fluid's measured surface density and the drilling fluid's equivalent circulating density downhole.

M-I ignores the intrinsic record and turns to extrinsic evidence to advance a definition that (1) contains a formula that is not found in the specification and (2) conflicts with the express teachings of the specification. M-I's formula comes from a 1988 text on drilling fluids, Darley, H.C.H. & Gray, G.R., *Composition and Properties of Drilling and Completions Fluids* (1988). While this particular reference is an excellent text on drilling fluids, it predates the development of pressure-while-drilling equipment. *See* Clark Rep. at 32. The formula is, therefore, merely a

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 30 of 46

calculated estimate as opposed to calculations based on actual pressure data from the well. In contrast, the specification makes clear that the equivalent circulating densities, as used in the intrinsic record, are based on the actual measurements taken by the pressure-while-drilling equipment located downhole near the drill bit. The formula proposed by M-I is simply not relevant and should not be substituted for the express teachings of the specification. Further, M-I makes no distinction between "ECDs" and "equivalent circulating density" even though the specification clearly treats them as distinct terms with different meanings.

M-I's recent attempt to include the term "wellhead" needlessly injects confusion where none exists. The "surface density" is measured at the surface of the well. For land-based and certain shallow-water wells, the "wellhead" is in fact located at the surface where samples can be collected. Clark Rep. at 67, n.39. This is what is referred to as "wellhead" in the specification. Col. 6:36-37. For a "deep-water" well, however, it is generally understood that the "wellhead" is located hundreds or thousands of feet below the drilling platform on the seafloor. Clark Rep. at 67, n.39. But for deep-water wells the "surface density" is still measured at the surface. *Id.* In reality, the operator obtains samples where the drilling fluid comes out of the top of the wellbore—at or near the surface of the drilling rig or platform for deepwater wells. *Id.* There is no mechanism for obtaining the "density" of the drilling fluid at the sea floor. *Id.* Those skilled in the art would understand the and not interpret the specification to reach the absurd conclusion that the "surface density" be measured at the seafloor. Therefore, Halliburton's proposed construction adequately defines the term and, contrary to M-I's proposed construction, does not add potential confusion.

4. "Less Than About 0.5" as Used in Claims 3, 16, 54, 124

This term is used, for example, in claim 3: "A method for drilling a borehole in a subterranean formation using a fragile gel drilling fluid …wherein … the ECDs are **less than**

Case 6:05-cv-00155-LED Document 99 Filed 03/17/2006 Page 32 of 47

about 0.5." Col. 14:35-41 (emphasis added). Halliburton proposes that the term "less than about 0.5" should be given its ordinary meaning as set forth below:

Less than about 0.5 means constituting a more limited number than about 0.5.

M-I improperly seeks to limit this term to 0.5 or less in contravention of the express teachings of the specification that show examples that exceed 0.5 in some instances. Recently, M-I suggested that this term needs no construction. *See* Letter of March 10, 2006 from John Keville, attached to this pleading as Exhibit E. Halliburton agrees as long as "about" means "about," specifically, that in the context of the claims, "about" means that the ECDs can slightly exceed 0.5 as illustrated in Table 1 of the patent. Col. 7:1-25. In other words, "about" should receive its ordinary meaning. *Ecolab Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001) (the term "about" like the term "'substantially" is a descriptive term commonly used in patent claims to "avoid a strict numerical boundary to the specified parameter").

A person of ordinary skill would understand that "about" means "about"—not exactly and not having a maximum of 0.5. Halliburton's construction properly reflects the fact that sometimes the difference exceeds 0.5 as illustrated in Table 1. To the extent that M-I suggests an upper limit of 0.5, its construction would exclude the preferred embodiment illustrated in Table 1—this is an improper result. *See, e.g., Vitronics*, 90 F.3d at 1583. Thus, M-I's proposed construction should be rejected.

5. "A Structure" as Used in Claims 9, 42, 47, and 85

Halliburton proposes that the term "a structure" should receive its ordinary meaning as "an entity that has ordered interaction between chemicals and particles." M-I seeks to improperly limit this term to a single one of several general definitions of "gel" as set forth in the specification. Review of the intrinsic record reveals that there is no justification for adopting the narrow construction proposed by M-I.

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 31 of 47

The term "a structure" is used by the claims in the context of describing a characteristic of the fragile gels of the claimed invention. For example, claim 9 is set forth below:

> The method of claim 8 wherein said ***fragile gel is a structure capable of*** suspending drill cuttings at rest and that may be immediately disrupted by movement of said fluid.

In many ways the claim is self-defining, explaining what the "structure" accomplishes but not requiring that the structure do so in any specific way. The term "structure" is used in the same way in the specification. For example;

> When drilling is stopped while using a drilling fluid of the present invention, and consequently the stresses or forces associated with drilling are substantially reduced or removed, the drilling fluid forms a ***gel structure*** that allows it to suspend drill cuttings and weighting materials for delivery to the well surface. Col. 2:42-47 (emphasis added).

See also Col. 5:30-34 (emphasis added). No particular structure is required. Hence the term "structure" should be given its ordinary meaning as proposed by Halliburton.

The extrinsic evidence also supports this conclusion. *Hawley's Condensed Chemical Dictionary,* 13th Ed. (1997), defines a "structure" as "the arrangement of atoms and groups in a molecule." Further, the expert report of Dr. Ronald K. Clark at 57-59 indicates that a person of ordinary skill in the art would construe the term as has been proposed by Halliburton.

M-I ignores the plain meaning of this term in favor of one of several of the definitions for "gel" as set out by the specification. *See* Col. 2:5-25. These definitions for the term "gel" were not intended to be limiting, but were instead provided for instructive purposes only. The specification does not limit the term "gel" to these definitions. Indeed, the specification makes clear that ". . . gels may be defined a number of ways. . . " Col. 2:10. None of the definitions is preferred over the others and the specification speaks only in terms that "gels" may or can be so defined, and not that they must. Moreover, nothing in the specification indicates that the term

"structure" should be defined with one of these definitions. To the contrary, the specification states merely that: "A gel ***has a structure*** that is continually building." Col. 2:22 (emphasis added). There is no reason to limit the term "structure" to a single one of the exemplary definitions for the term "gel" as set forth in the specification. M-I's proposed construction should be rejected.

6. "Viscosity" as Used in Claims 12, 50, 88 and 89

Halliburton proposes that the term "viscosity" should be given its ordinary meaning as "a property of fluids indicating their resistance to flow." M-I's construction also defines "viscosity" as "resistance to flow" but M-I also seeks to further limit and define this term using a formula not found in the specification.

The claims and specification illustrates that the term "viscosity" is used in it ordinary sense. As set forth in the claims viscosity is used to describe the drilling fluids "resistance to flow" at different temperatures. For example, claim 12 is set forth below:

> The method of claim 1 wherein said thinner reduces the viscosity of said drilling fluid at lower temperatures to a greater extent than it reduces the viscosity of said drilling fluid at higher temperatures.

This phenomenon is explained in the specification:

> The yield point is unexpectedly lower at 40 degrees than at 120 degrees. Prior art oil-based fluids typically have lower yield points at higher temperatures, ***as traditional or prior art oils tend to thin or have reduced viscosity as temperatures increase. In contrast, the fluid of the invention can be thinned at lower temperatures without significantly affecting the viscosity of the fluid at higher temperatures***. This feature or characteristic of the invention is a further indicator that the invention will provide good performance as a drilling fluid and will provide low ECDs. ***Moreover, this characteristic indicates the ability of the fluid to maintain viscosity at higher temperatures***.

Col 8:65 - Col. 9:10 (emphasis added). Viscosity is described in terms of the fluid being "thinned"—its resistance to flow being reduced. While the calculated "yield point" is also an indication of the viscosity, there is nothing in the specification that dictates a formula be used to

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 35 of 47

define "viscosity" as used in the claims. Halliburton's proposed construction reflects this fact. Halliburton's construction is also consistent with the relevant extrinsic evidence. For example, viscosity is defined in several well know treatises as follows:

> "The internal resistance to flow exhibited by a fluid." *Hawley's Condensed Chemical Dictionary*, 13th Ed. (1997).
>
> "The internal resistance offered by a fluid to flow." *Glossary of Oilfield Production Terminology*, 1st Ed. (1988).
>
> "The resistance to flow of a fluid." *The Facts on File Dictionary of Chemistry,* 3rd Ed. (1999).

See also Clark Report at 62-63.

The formula M-I seeks to inject into the claims ("the ratio of shear stress to shear rate") is not found in the specification. And while the formula is one way to determine a value indicating the viscosity of a simple Newtonian fluid, there simply is no basis for limiting the claim to this formula. Indeed, the patent teaches that viscosity—the resistance to flow—can be measured in other ways, that, for a given application, may be comparable or superior. For instance, the Brookfield viscometer measures the "response" of the claimed drilling fluid when disrupted in units of "% Torque." Col. 4:11-13 and Figure 3. Figure 9 shows a bar graph comparing "yield points" representing the Fann viscometer "dial readings." Col. 4:38-44. Thus, the "resistance to flow" found in definitions of both Halliburton and M-I can be illustrated in various ways beyond the formula contained in M-I's proposed construction. Further, for a non-Newtonian fluid such as the claimed invention, the true viscosity is a function not only of shear rate and shear stress, but also of temperature, pressure, and time. M-I's proposed construction ignores those other factors. M-I's attempt to inject a formula to further limit the term, "viscosity" should be rejected.

7. "Approximates the Surface Density" as Used in Claims 15, 53, and 92

Halliburton proposes that the term "approximates the surface density" should receive its ordinary meaning as "to come near in value to the surface density." In contrast, M-I has proposed that the term be construed as "about the same density as at the wellhead." The point of contention is that M-I seeks to define "surface" as the wellhead. This construction needlessly injects confusion where none exists. As noted in §IV.B.3, for deep-water wells, M-I's constrictive definition would require that the operator manually obtain samples from the seafloor—a person of ordinary skill would recognize the impracticality (or impossibility) of this requirement and would therefore not impose this limitation. *See* Clark Rep. at 67, n.39. Therefore, Halliburton's proposed construction adequately defines the term and, contrary to M-I's proposed construction, does not add potential source of confusion.

C. Terms M-I Asserts Are "Incapable of Construction"

Every patent's specification must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. §112, ¶2. The definiteness requirement, however, does not compel absolute clarity. *Datamize v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005). Only claims "not amenable to construction" or "insolubly ambiguous" are indefinite. *Id.* (quoting *Novo Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1353 (Fed. Cir. 2003); *Exxon Research & Eng'g Co. v. United States,* 265 F.3d 1371, 1375 (Fed. Cir. 2001)). Thus, the definiteness of claim terms depends on whether those terms can be given <u>any</u> reasonable meaning. *Datamize*, 417 F.3d at 1347.). The law requires only that the claims "reasonably apprise those skilled in the art both of the utilization and scope of the invention," and that "the language is as precise as the subject matter permits." *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 624 (Fed. Cir. 1985).

Case 6:05-cv-00155-LED Document 93 Filed 03/20/2006 Page 37 of 47

Further, simply because an issue of claim construction is difficult does not *ipso facto* result in a holding of indefiniteness. *Exxon Research & Eng'g*, 265 F.3d at 1375. "If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds." *Id.* "By finding claims indefinite only if reasonable efforts at claim construction prove futile, we accord respect to the statutory presumption of patent validity [35 U.S.C. §282], [citation omitted], and we protect the inventive contribution of patentees, even when the drafting of their patents has been less than ideal." *Id.* Even if the Court's conclusions may be those over which reasonable persons may disagree, the Court must make every legitimate effort to protect the inventive contribution of patentees. *See Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1372 (Fed. Cir. 2004).

In the face of an allegation of indefiniteness, general principles of claim construction apply. *See Oakley, Inc. v. Sunglass Hut Int'l*, 316 F.3d 1331, 1340-41 (Fed. Cir. 2003) (noting that a determination of definiteness "requires a construction of the claims according to the familiar canons of claim construction."). "Determining whether a claim is definite requires an analysis of 'whether one skilled in the art would understand the bounds of the claim when read in light of the specification.'" *Omega Eng'g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1320-21 (Fed. Cir. 2003) (quoting *Miles Labs Inc. v. Shandon Inc.,* 997 F.2d 870, 875 (Fed. Cir. 1993)). Analysis of the claims terms at issue under the strictures of claim construction explained in the *Phillips* case reveals that the terms as understood by those skilled in the art in light of the intrinsic record are definite. These "definite" bounds are set forth in Halliburton's proposed claim constructions for the nine terms identified by M-I as "incapable of construction." M-I does not offer any alternative construction. The issue then is whether the claims as construed by

Halliburton are definite; that is, they are supported by the record as understood by those skilled in the art.

1. "Fragile Gel Behavior" as Used in Claim 128

The term "fragile gel" used in the context of "behavior" is used throughout the specification to describe the "fragile gels" of the invention. The specification describes in detail what this behavior entails:

> A "fragile gel" as used herein is a "gel" that is easily disrupted or thinned, and that liquifies or becomes less gel-like and more liquid-like under stress, such as caused by moving the fluid, but which quickly returns to a gel when the movement or other stress is alleviated or removed, such as when circulation of the fluid is stopped, as for example when drilling is stopped. The "fragileness" of the "fragile gels" of the present invention contributes to the unique and surprising behavior and advantages of the present invention. The gels are so "fragile" that it is believed that they may be disrupted by a mere pressure wave or a compression wave during drilling. They seem to break instantaneously when disturbed, reversing from a gel back into a liquid form with minimum pressure, force and time and with less pressure, force and time than known to be required to convert prior art fluids from a gel-like state into a flowable state.
>
> When drilling is stopped while using a drilling fluid of the present invention, and consequently the stresses or forces associated with drilling are substantially reduced or removed, the drilling fluid forms a gel structure that allows it to suspend drill cuttings and weighting materials for delivery to the well surface. The drilling fluid of the invention suspends drill cuttings through its gel or gel-like characteristics, without need for organophilic clays to add viscosity to the fluid.

Col. 2:32-53. *See also* Col. 2:62-63; Col. 3:20-25; Col. 5:45-48. The term "fragile gel behavior," therefore, should be defined consistent with the definition for the term "fragile gel" as used in the context of "drilling fluids" as is explained in Halliburton's Opposition to M-I's Motion for Summary Judgment of Invalidity filed commensurately herewith and incorporated into this pleading:

> "Fragile gel behavior" means the gel easily transitions to a liquid state upon the introduction of force (e.g., when drilling starts) and returns to a gel when the force is removed (e.g., when drilling stops); the fragile gel, at rest, is capable of suspending drill cuttings and weighting materials.

2. "Without Significant Loss of Drilling Fluid" as Used in Claims 21, 59 and 96

As used in these claims "without significant loss of drilling fluid" describes one of the main benefits of the claimed "fragile gel drilling fluid"—that by drilling with it fluid losses will be greatly reduced. *See, e.g.,* Col. 16:57-58 (Claim 21). The point of contention is what constitutes a "significant loss" as opposed to one that does not. The specification shows the way.

> As illustrated in FIGS. 1(a), (b), (c), and 2, the present invention provides an invert emulsion drilling fluid that may be used in drilling boreholes or wellbores in subterranean formations, and in other drilling operations in such formations (such as in casing and cementing wells), ***without significant loss of drilling fluid when compared to drilling operations with prior art fluids***.
>
> FIGS. **1**(*a*), (*b*), and (*c*) show three graphs ***comparing the actual fluid loss*** experienced in drilling 10 wells in the same subterranean formation. In nine of the wells, an isomerized olefin based fluid … was used. In one well, … a fluid having the features or characteristics of the invention … was used.
>
> … FIG. 2 ***compares the loss of mud*** with the two drilling fluids in running casing and cementing at different well depths in the same subterranean formation.

Col. 4:56 - Col. 5:24 (emphasis added). With reference to Figures 1(a) of the patent, the well drilled with a fluid of the claimed invention (well "H") exhibited a loss of about 300 barrels. In comparison, the well with the best performing prior art fluid (well "E") exhibited a loss of about 500 barrels. Expressing this mathematically, when used with the claimed invention, the drilling operation lost only about 60% of the amount of fluid as was lost in comparison with the best performing prior art drilling fluid.[6] Or put another way, the claimed drilling fluid showed losses that were 40% less than those of the best conventional fluid. Figures 1(b) and 1(c) are expressed in BBLS Lost per BBLS Hole Drilled and BBLS Lost Per Foot respectively. Each is consistent with Figure 1(a). Taking the worst case scenario for the claimed invention in Fig. 1(a), any loss

[6] In contrast, the worst performing conventional fluid exhibited a loss that was over 700% greater than the claimed fluid.

Case 6:05-cv-00155-LED Document 93 Filed 03/2006 Page 39 of 46

that is in excess of 60% the loss that would be expected of a conventional fluid would be substantial. Thus, Halliburton's proposes the following claim construction:

> Significant loss of drilling fluid means having drilling fluid losses that are 60% or more than that of a conventional drilling fluid.

This is fully supported by the specification and the extrinsic evidence as well. At the time those skilled in the art would know that during the course of drilling into a subterranean formation, loss of drilling fluid is inevitable. Clark Rep. at 16, 49-50. The loss can be substantial and very costly; therefore, fluid loss is constantly monitored such that the loss of fluid on each well is known. *Id.* A person of ordinary skill would understand that "without significant loss" involves a comparison to other drilling fluids—not a "loss" in an absolute sense—particularly in light of Figure 1 of the patent. *Id*. Figure 1 would be relied on by a person skilled in the art to determine what "significant loss" means in the context of the prior art. It is fully disclosed that a loss of about 60% or more indicates mud loss normally associated with the prior art. Those skilled in the art readily understand these facts based on review of the intrinsic record, which is all that is required. *Shatterproof Glass Corp,* 758 F.2d at 624. Indeed the nature of the technology requires no more. Those skilled in the art know and understand that there are many variables that can affect how much drilling fluid is lost on a well and that the characteristics and performance of the drilling fluid itself can have a significant effect. Clark Rep. at 49-50. Hence those skilled in the art do not require exactitude but rely on guidelines as indications of performance. *Id*. Here a loss of about 60% or more of the loss exhibited by a conventional drilling fluid would indicate that the drilling fluid is not performing as a "fragile gel drilling fluid." In other words, losses normally associated with the prior art systems are being experienced. These parameters are sufficient to place one skilled in the art on notice of the bounds of the claims. Thus, the term "without significant loss of drilling fluid" is definite.

Case 6:05-cv-00155-LED Document 99 Filed 03/21/2006 Page 41 of 47

3. "No Appreciable Pressure Spike" as Used in Claims 11, 49, 87, and 128

Halliburton proposes that the term "no appreciable pressure spike" should receive its ordinary meaning as "very low or no pressure measured upon resumption of fluid movement that could cause an adverse effect on a drilling operation." Review of the intrinsic record reveals that the term is well defined.

Use of the term in the context of the claims is instructive. Claim 11 is set forth below:

> The method of claim 8 wherein no appreciable pressure spike is observed by pressure-while-drilling equipment when said drilling is resumed.

The specification explains this phenomenon in terms of the "fragile gel drilling fluid":

> Nevertheless, when drilling is resumed, the fragile gel is so easily and instantly converted back into a liquid or flowable state that ***no initial appreciable or noticeable pressure spike*** is observed with pressure-while-drilling (PWD) equipment or instruments. In contrast, such pressure spikes are commonly or normally seen when using prior art fluids.

Col. 2:52-57 (emphasis added).

As understood by those skilled in the art, from time to time, drilling will stop while, for example, the operator adds a length of pipe to the drill string. Clark Rep. at 59-61. While this is happening, the circulation of the drilling fluid will cease. *Id.* Once the pipe is added, circulation of the drilling fluid and rotation of the drill string resumes. *Id.* The pressure required to start circulation is constantly monitored (with a PWD instrument) because too much pressure too fast can cause a "pressure spike" that can adversely affect the well. *Id.* The pressure spike is a force that is exerted on the well bore and, if great enough, can cause the formation to fracture, which can lead to a loss of drilling fluid or loss of the well if circulation cannot be achieved. *Id.* A person skill in the art would understand that some pressure is required to accomplish circulation. *Id.* Low pressures—ones that will not fracture the formation or cause a blow-out—are tolerable, but a "pressure spike" of great enough magnitude, that is, an amount of pressure that a person of

Case 6:05-cv-00155-LED Document 93 Filed 03/20/2006 Page 42 of 47

ordinary skill would "appreciate"[7] as possibly causing harm to the well, is not tolerable. The claimed invention eliminates the prospect of that "appreciable pressure spike"—one that could cause harm to the well. The phrase "no appreciable pressure spike" as defined by Halliburton is definite and fully supported by the specification.

4. "Incorporates Said Additives Quickly" as Used in Claims 40, 78, and 115

Halliburton proposes a construction for the term "incorporates additives quickly" supported by the specification as set forth below:

> Without need for multiple circulations of the fluid to show the effect of the addition.

The term is used in the claims in the context of describing an attribute of the claimed drilling fluid. For example, claim 40 is set forth below:

> The method of claim 39 wherein said drilling fluid incorporates said additive or additives quickly.

The specification clearly spells out what is meant by incorporating a additive "quickly:"

> The drilling fluid of the invention responds quickly to the addition of thinners, with thinning of the fluid occurring ***soon after the thinners are added, without need for multiple circulations of the fluid*** with the thinners additive or additives in the wellbore to show the effect of the addition of the thinners.

Col. 2:66 – Col. 3:4 (emphasis added). Thus, the specification unambiguously and dispositively shows what the inventors intended by the language "incorporates said additives quickly" to mean "without the need for multiple circulations" as proposed by Halliburton.

Thus, M-I's assertion that the term is "incapable of being" is insupportable and without merit.

---

[7] The definition of "appreciate" is "to grasp the nature, worth, quality, or significance of." *Merriam-Webster's Collegiate Dictionary*, 10th Ed. (2001).

5. "No Significant Sag" as Used in Claim 128

Halliburton proposes a construction for the term "no significant sag" supported by the specification as set forth below:

> No significant sag means no noticeable or uneven distribution of weighting materials along the length of the borehole in the drilling fluid at rest in a deviated borehole.

In the specification, sag is described in the following context: "The drilling fluid of the invention suspends drill cuttings through its gel or gel-like characteristics, without need for organophilic clays to add viscosity to the fluid. As a result, sag problems do not occur." As indicated by this language, only problematic sag would be noticeable or of concern in a drilling operation, Halliburton's definition is consistent with the specification.[8] *See* Clark Rep. at 74-75 (depicting evidence of sag as increased pressure spikes revealed by pressure while drilling equipment). Further, the customary and ordinary meaning of sag is stratification or uneven distribution of weighting materials along the length of the borehole in the drilling fluid at rest in a deviated borehole. *See* Clark Rep. at 74 (defining sag as "a condition in high-angle and deviated wells where the weighting materials added to the drilling fluid will settle on the low side of the wellbore"). Given this intrinsic and extrinsic support, the term is neither indefinite nor incapable of construction. Therefore, the Court should adopt Halliburton's construction.

6. "Generally Flat Rheology" as Used in Claim 128

Halliburton proposes a construction for the term "generally flat rheology" supported by the specification as set forth below:

> Generally flat rheology means there is no significant difference in the rheology of the fluid at two different temperatures (e.g., 40 and 120 degrees Fahrenheit).

[8] It is also consistent with the usage with that found in, for example, claim 57: "The method of claim 2 wherein said fluid does not exhibit sag when at rest." This claim is of a more restricted scope.

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 44 of 47

The specification states: "The present invention also provides a drilling fluid with a relatively flat rheological profile." *See* '832 Patent, Col. 8:26-27. The specification goes on to provide rheological data for the fluid of the invention over a temperature range of 40 to 120 degrees Fahrenheit. *See* '832 Patent, Table 2. In describing this data as evincing a flat rheological profile, the specification states "the change in temperature … resulted in minimal change in fluid behavior." Col. 8:61-62. The generally flat rheology is further depicted in Figure 9(a), showing the differences in yield point of a fluid of the invention at two different temperatures (40 and 120 degrees Fahrenheit). Furthermore, the definition of "flat rheology" as lacking significant difference in rheological properties over a temperature range is consistent with the customary and ordinary meaning of the term. *See* Clark Rep. at 75-77 (defining "generally flat rheology"). Therefore, the term "generally flat rheology" is neither indefinite nor incapable of construction.

V. CONCLUSION

For the reasons as set forth in the foregoing pleading, Halliburton respectfully asks this Court to adopt the claim constructions proposed by Halliburton and to reject the claim constructions as proposed by M-I.

Respectfully submitted,

/s/______________________
Monte M. Bond
GODWIN GRUBER, LLP
Attorney-in-Charge
Bar No. 02585625
Renaissance Tower
1201 Elm Street, Suite 1700
Dallas, Texas 75270
(214) 939-4400 - Telephone
(214) 760-7332 - Facsimile
mbond@godwinpappas.com

Michael E. Jones
POTTER MINTON, P.C.
State Bar No. 10929400
500 Plaza Tower
Tyler, Texas 75702
(903) 597-8311 - Telephone
(903) 593-0846 - Facsimile
mikejones@potterminton.com

COUNSEL FOR PLAINTIFF
HALLIBURTON ENERGY SERVICES, INC.

CERTIFICATE OF SERVICE

I certify that on this day, pursuant to LOC. R. CIV. P. CV-5, I filed or caused to be filed, a true and correct copy of this instrument, giving service of this instrument to the following counsel, all of whom have consented to electronic service:

Stephen H Cagle
Katherine J Holland
Howrey LLP
1111 Louisiana, 25th Floor
Houston, Texas 77002-5242
(713) 787-1400 - Telephone
(713) 787-1440 - Facsimile
cagles@howrey.com
hollandk@howrey.com

Sidney Calvin Capshaw, III
Brown McCarroll—Longview
1127 Judson Rd - Ste 220
PO Box 3999
Longview, TX 75606-3999
(903) 236-9800 - Telephone
(903) 236-8787 - Facsimile
ccapshaw@mailbmc.com

/s/ 3/17/06
Monte M. Bond Date

Case 6:05-cv-00155-LED Document 93 Filed 03/17/2006 Page 47 of 47

APPENDIX A—AGREED CONSTRUCTIONS

Subsequent to the submission of the parties' Joint Claim Construction and Pre-hearing Statement, the parties reached agreement on the construction of various terms originally identified by M-I as being in need of construction. See Letter of March 10, 2006 from John Keville, attached to this pleading as Exhibit E. The agreed-upon constructions are:

- Paraffins: Saturated hydrocarbons.
- Glyceride triester: An ester made by the reaction of glycerol with carboxylic acid.
- Napthenic hydrocarbons: Any saturated, cycloparaffinic compound.
- Esters: Esters are any of a class of often fragrant compounds that can be represented by the formula RCOOR'.
- Olefins: Compounds that have one or more double bonds between carbon atoms in the chain.
- Mineral oil hydrocarbons: Highly refined hydrocarbons derived from crude oil.
- Continuous base: An oil which constitutes the continuous phase of an invert emulsion.

Also subsequent to the submission of the parties' Joint Claim Construction and Pre-hearing Statement, Halliburton withdrew six asserted claims (claims 22, 23, 61, 62, 98, and 99). For the purposes of claim construction, this effectively eliminated the need for this Court to construe an additional three terms, namely "lower differences," "faster drilling rates," and "low difference."